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Naval Safety Center at a Glance

Part IV

THIS installment presents the Aircraft Operations Division (AOD) of the Naval Safety Center's Aviation Safety Programs Directorate. Divided into four branches, we support the following aviation communities: Fighter/Attack, Multi-Engine (VP, VAW, VR, VS), Rotary Wing and Air Operations (Facilities). The branches are staffed with safety analysts who provide representation by aircraft model or functional area. A total of 20 officers, chief petty officers and civil service personnel provide the manpower required to analyze these segments of naval aviation.

It is the analysts who are the heart and soul of the Aircraft Operations Division. Each is a seasoned veteran possessing mission experience in a particular warfare/occupational specialty. They are not only *staff officers,* but sailors and marines who understand the problems you face. To assist the fleet, each analyst's duties include, but are not limited to the following:

- Review hazard/mishap reports
- Assist mishap investigation boards
- Prepare closeout endorsements for Class "A" mishaps
- Participate in safety surveys
- Attend conferences (NATOPS, NWP, SSWG)
- Respond to fleet request for safety information
- Prepare flight safety advisories
- Provide analysts' newsletters/safety presentations
- Conduct liaison with other services and manufacturers
- Maintain currency in one fleet aircraft model (all pilots/NFOs are DIFOPS)

Analysts' duties are similar from one branch to another with the exception of the Air Operations Branch. Its primary focus is not individual aircraft types but shipboard/airfield facilities, aircraft handling, firefighting, crash/salvage, refueling and air traffic control procedures.

All the branches receive support from two specialists in the area data retrieval and analysis. The Special Assistant and the Operational Analyst provide training to all newly reporting division members and regularly assist them during special projects and studies.

The product of the Aircraft Operational Division is support to all aviation commands. Our work is both interesting and challenging. It is hoped that you, the customer, now have a better understanding of our duties and capabilities. A list of AOD personnel is provided below. Each can be reached at Autovon 564-3381 or (804) 444-3381. Call your NAVSAFECEN aircraft operations analyst, get to know him and help him to help you.

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111A2	F-4, F-16, KFIR, (AVIATION SAFETY SURVEYS)	MAJ L.D. COHEN, USMC
111A3	F/A-18, T-2, T-45	MAJ G.E. ROBERTSON, CF
111B	A-3, A-7	VACANT
111B1	A-4, AV-8, OV-10	CAPT D.H. TIERNEY, USMC
111B2	A-6, EA-6	LCDR R.R. AYRES
111D	NFO	LCDR R.R. AMELON
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112A	P-3, TC4C, C-1, C-9, C-118, C-130,C-131, NKC-135	CDR E.R. JOHNSTON, JR.
112B	S-3, E-2, C-2, C-12, T-34, T-44, T-39, T-47	CDR R.E. MESSERSMITH
113	ROTARY WING BRANCH HEAD	CDR J.E. KAUFFMAN
113A	H-46	CDR J.E. KAUFFMAN
113B	H-2, H-60	LT R.W. SKOTTY
113C	H-1/AH-1, H-53, H-57	MAJ C.O. DUFF, USMC
113D	H-3	LCDR W.C. HARMON
114	AIR OPERATIONS BRANCH HEAD	CDR D.L. GRACIE
114A	AIR OPERATIONS	LCDR J.H. STARNES
114B	AIR TRAFFIC CONTROL	ACCM F.G. MCGEE
114C	AIR OPERATIONS	ABCS V.A. BRUST

inside approach

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P-3 of VP-44 over Seguin Island, Brunswick, Maine. (Photo by PHAN Bruce Haskell)

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Editor's Note: This story is a composite of several actual incidents which have occurred over the past several years involving military jets and aircraft involved in forest fire-fighting.

Wildfire!

By Robert L. Hancock

THE fire had only been burning for three hours. As I started down into the steep-walled canyon, I thought about how much it had spread since I had first seen it. Then it had been small, little more than 20 acres. But the hot, dry winds from the desert had whipped up the flames into a monster which by now had consumed over 1,500 acres of brush and timber. There were no predictions of when we would gain control. I flew down along the face of the fire, carefully staying clear of the smoke. As air tanker coordinator over the fire, I was responsible for directing the air tanker drops and ensuring the safe, efficient use of the air tankers. As I flew along the raging face of the monster below me, I was thinking of the best place for the 3,000 gallons of fire retardant the tanker above me carried and was ready to deliver.

"Tanker One-nine-zero, this is the drop area. Just widen out your left turn, and I'll pick you up for the drop."

"Roger, I've got you in sight." The voice crackled in the earphones of my helmet. As I added power and started a steep climbing left turn out of the canyon, I saw the DC-7 in a wide, graceful left turn about three-quarters of a mile away and about 2,000 feet above me.

"Lead, Seven-four, how's the air down there?" asked the captain of Air Tanker 190. He was definitely not overjoyed about taking a large, heavily loaded aircraft into the bottom of that steep, narrow and twisting canyon without knowing all the conditions.

"Some turbulence as we pass from base to final over the ridge, and some trace smoke in the canyon. Visibility is always at least one mile and the air is smooth. You will have a slight tailwind in the drop area and your exit is down canyon." As I briefed, I thought about the run we were going to make. It would start by crossing a high ridge and dropping into a narrow canyon leading to the main canyon. This auxiliary canyon was 30 degrees off the heading of the main canyon where we would drop. The run required a 30-degree course change to the left just prior to the drop area. Just then my radio crackled again.

"Lead Seven-four, this is Air Attack Four. It looks like your additional air tankers are starting to arrive. I've just received a call from MAFFS Three, ETA three minutes.*"

The air attack supervisor was in constant contact with the incident commander on the ground and relaying his orders for aerial suppression to me as I directed the air tankers to their targets. I had requested additional tankers, and they were now arriving. With all our other tankers committed to other fires, we were now using MAFFS-equipped C-130s, flown by Air National Guard crews.

I was now 500 feet from Tanker 190 on a parallel course at 6,300 feet, indicating 130 knots. "One-nine-zero, are you ready?" I asked.

"We're ready," came the reply. I turned my Baron across the ridge and dropped down into the canyon. The tanker slid in behind me as we continued toward the drop zone. I kept my conversation to a minimum because the tanker crew were very busy now setting up for a drop and running checklists. Then we entered the long, narrow canyon.

As we approached the drop area, I called, identifying terrain features and indicated the drop area, verbally and with a wing rock. As I pulled up, I saw that it was a good drop. I called for 190 to load and return, then started looking for my next tanker. It wasn't long in coming.

"Lead Seven-four, this is Helicopter Seven-ten, we're three minutes out and need to land near your drop area."

"Roger, Seven-ten," I replied, "one DC-7 on departure from a drop, down canyon, and I'll be bringing in a C-130 in a couple of minutes."

"Any jets down there? I had a near miss with one while I was lifting off the ridgetop heliport about five miles west of here."

"Stand by, Seven-ten." This last query from the helicopter pilot set me thinking. I was concerned because the area we were working in was along a military low-level training route and near a large military operating area. When I had first arrived, I had checked to be sure that a NOTAM had been issued for our operation. Under the federal aviation regulations, the area of a fire can be

*MAFFS — Modular Airborne Fire Fighting System.

NAVY
NAVY
B Rader

"Approaching the drop area . . . drop here!" I glanced back to see the drop then turned my attention straight ahead to start the climb when I saw them — two aircraft head-on at our altitude!

designated as restricted airspace. The only aircraft allowed in are those actually participating in the firefighting or have special permission to be there. I had also confirmed that the NOTAM would be transmitted to the military bases in the area. Still, the helicopter incident had me worried. Our helicopters are very hard to see since they often blend in with the hillsides. I checked again with the air attack supervisor who confirmed that the NOTAM was still valid. He asked if we were having a problem to which I responded with the helicopter incident. I also said that I believed it was an isolated occurrence.

By now I had climbed out of the canyon and was looking for my next tanker. I soon picked up the unmistakable silouette of the C-130. I briefed the crew and marked the drop area prior to the run. Then after the marking pass and verbal description of the target area, I pulled up alongside the C-130 and we prepared for a live run. Our airspeeds were matched at 140 knots and the C-130, MAFFS Three, was 500 feet in trail matching me turn for turn as I made my left turn over the ridge and dropped back down into that narrow canyon which would lead us to the main canyon and the fire.

"MAFFS Three, this is Lead Seven-four, approaching the main canyon. Remember, stay to the right side and put retardant right next to the visible flames, half in and half out."

"MAFFS Three, Roger," came the reply.

As we turned into the main canyon, we were around 200 feet AGL, 140 knots. It looked like my small red and white Baron was being pursued by a huge olive-drab monster with orange dayglo wingtips and tail and two large pipes extending out of the open rear ramp.

"Approaching the drop area . . . drop here!" I glanced back to see the drop, then turned my attention straight ahead to start the climb when I saw them — two aircraft head-on at our altitude! It was so fast that I still had the mike button depressed from my drop call.

"Aircraft straight ahead! Abort! Abort! Climb straight ahead!"

I slammed the throttles of the Baron full forward and pulled back into a max performance climb. As soon as my climb was established, I rolled to look for my C-130 tanker. My call was too late to prevent the drop, so when I looked back I saw the "Herky Bird" about 30 degrees nose-up clawing for altitude and spewing 3,000 gallons of retardant in a bright red stream in the sky. I saw the two aircraft flash past about 200 feet away. It all happened so fast that I wasn't even sure what kind they were. I knew that they were some kind of fighter, I thought F-4s.

"What the hell is happening, lead?" The C-130 crew was understandably shook. But before I could answer, the radio came alive again.

"Lead Seven-four, Helicopter Seven-ten. Are you guys all right?"

"Lead, Seven-four, Air Attack Four, what's happening? Is everybody OK?"

The C-130 and I continued to climb for safety as I began to sort things out. I obviously had a real problem, the helicopter near miss earlier and now this . . . As much as I disliked the decision facing me, it was the only one possible under the circumstances.

"Air Attack Seven-four, Lead Seven-four, we just had a near miss with a couple of military jets. That's the second one in just a short time. It doesn't look like our restriction is holding. I'm going to shut down the air show until we get a handle on this. It's just too dangerous down there now. I want the helicopters grounded, too. They are just too hard to see. I think you can safely stay on scene, if you stay above 2,000 AGL."

I then returned to the air tanker base. As aviation safety officer I had a lot of work to do. First, I had to call the forest office to explain why I had just cut off all use of aerial firefighting support to a major fire. Next, I had to find out why our NOTAM restriction didn't work. I called Naval Air Station West Coast, the owner of the low-level route. They were aware of the NOTAM and, in addition, had no aircraft in the area at the time of the near miss. They confirmed that after they had received the information about the fire, they had canceled all flights on the low-level route until we released the airspace. Next, I called High Mountain Air Force Base which controlled the military operating area adjacent to the fire. They were just as concerned as the Navy, but at the time of the incident they had no known aircraft operating in the MOA. They also assured me that all their crews were aware of the NOTAM restriction.

After I hung up from that last call, I sat at my desk for a while pondering the real problem. We were facing a major out-of-control fire that desperately needed aerial support, but I still had no clue to who had been violating our airspace. After considering the reassurances of the military and the FAA that our airspace restrictions were still in effect, I decided to reinstitute air support to the fire. I gave all the aircrews a special briefing on our previous incidents and emphasized the need for an extra sharp lookout for other aircraft.

The air tankers were quickly back in the air and attacking the fire. Unfortunately, the damage was already done. The

loss of tanker support after I was forced to shut down air operations allowed the fire to cross the canyon. It took four more days and cost another 11,500 acres before the fire was finally under control.

At the high point of air operations, the Forest Service, along with other cooperating agencies, were operating 12 regular contract air tankers with three additional MAFFS C-130s. We also had six helicopters assigned and two air attack ships. There were aircraft over the fire 24 hours a day, every day of the fire. At night, while the air tanker crews were resting, the helicopters were working. Two Bell 212s with crews using night-vision goggles delivered retardant from their 350-gallon tanks. Another aircraft orbited over the fire at about 1,500 feet AGL transmitting infrared pictures to the incident commander on the ground.

The suppression costs for the fire were impressive. The air effort alone cost $1,321,475. The entire suppression costs were over $4,884,000. These are the figures for direct suppression only. The loss of timber, recreation areas, watershed and personal property was estimated to cost another $12,600,000. Of the total cost, *about 31 percent was directly attributable to the near miss* which caused a four-hour shutdown of all air operations. That is all the time the fire needed to get completely out of control.

TWO DAYS LATER: A MILITARY OFFICER'S CLUB — MANY MILES AWAY FROM THE FIRE

A group of pilots are sitting around a table, relaxing after a mission. A commentator on the TV over the bar is discussing the serious consequences of a major fire which had recently devastated a large area to the west.

"Hey, I bet that's the fire that we saw the other day," said one of the pilots.

"Probably," responded another, who then continued, "I wonder what those planes were doing down in that canyon next to the fire? We came pretty close out there."

A new voice interjected, "Those aircraft were part of the Forest Service aerial fire suppression operations." A young lieutenant commander, the squadron safety officer, sat down at the table.

"There was a NOTAM out for that area," the safety officer continued, "and if you had contacted West Coast or High Mountain, they would have told you about it."

"But that's VFR airspace and we were at legal altitude. Besides, we got a brief and there wasn't anything about a fire."

"Your briefing may have been before the NOTAM was out. You know, you could've busted your tails out there sightseeing at that fire. I was talking to the safety officer at High Mountain yesterday. He told me that one day during the fire, maybe the day you were there, tactical jets had near misses with a Forest Service helicopter and later with an Air Guard C-130. The near miss caused the Forest Service to shut down the air suppression, and the fire got out of control."

"Hey, wait a minute." One of the pilots interjected, "All we did was take a look, one pass. We saw the Herk and we were clear of him."

The safety officer took a sip of his drink before answering. "What was your closure rate, about 500 knots? That Herk never saw you until the last second. And what about the helicopters and other aircraft that were operating in the area, did you see any of them? The Forest Service uses a lot of aircraft when they fight fires. Even if you don't see any fixed-wing aircraft, there were probably helicopters in the area. It doesn't matter how remote the area, you've gotta assume there are aircraft there."

"The Forest Service tells me that the first few hours of a fire are critical. They've got to commit resources right away to keep a fire under control. Any delay and things get OBE in a hurry. After the near misses the other day, the Forest Service pulled all air support out of the area. They couldn't afford the risk of a midair. That let the fire get out of control. You just saw the result on the tube."

"Damn," said the first pilot, setting his glass down." I hope the skipper doesn't hear about that."

"I'd be more worried about living long enough to retire if I were you," the commander replied.

"Hey, you made the point," the young flier protested," I'm not going within a hundred miles of any more fires."

The safety officer grinned as he motioned to the waitress for another round.

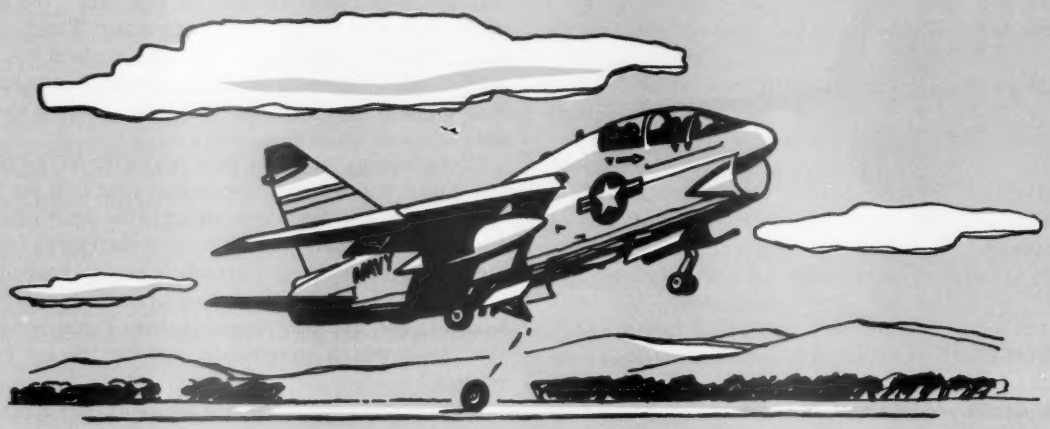
MEANWHILE:

Above a steep-walled canyon, a small white and red aircraft banked sharply, the pilot sizing up his target. "Air Attack Seven, is our airspace restriction in effect?"

"Lead Seven-one, affirmative."

"OK, break, Tanker Two-ten, are you ready?" ◄

Mr. Hancock is a pilot and the aviation safety officer for the South Zone Aviation Unit of the U.S. Department of Agriculture Forest Service.



Wanna be a g-man? The TF-18A crew launched on a weapons training sortie with the instructor pilot (IP) in the rear seat and the replacement pilot (RP) in the front. Once in the practice area, the IP initiated a hard turn, reaching eight G's in two seconds. The RP lost consciousness during the turn and regained consciousness 15 seconds after the maneuver was terminated. He said his breathing was constricted, preventing him from performing a proper M-1 straining maneuver. He reported that the G-suit hose had become disconnected sometime during the turn. Post-flight inspection revealed no discrepancies in the hose attachment, although the inhalation/exhalation valve in the oxygen hose was stuck closed and the internal shroud line which prevents the hose from collapsing was extended.

As the Hornet assumes greater presence in the fleet, such incidents are going to occur until people get used to the fact that the aircraft can take more than its crew. Is it possible that a re-evaluation of the G-suit system might be in order? Yes! The F/A-18 system safety working group (SSWG) is actively working on it. — Ed.

The Tireless Corsair. Petty Officer Mike Harrell was on duty working departures from NAS Lemoore's runway 32. The visibility was down to 1½ miles.

He watched as a VA-122 TA-7C began its takeoff roll. As the two-seat Corsair broke ground, Harrell saw the left main landing wheel separate from the gear and roll down the runway. Harrell told his watch supervisor, AC3 Dustin Brodrogi.

The TA-7 pilot was quickly informed of his problems, and a second airborne Corsair was asked to look the TA-7 over. The second plane's pilot confirmed the loss of the wheel, and the TA-7 crew dumped fuel and set themselves up for an arrested landing.

Meanwhile, normal field operations were halted. Aircraft already airborne orbited, while those on the ground remained where they were.

Lt. Michael Gallagher, the instructor pilot, and his student, Lt. John Gately, made an arrested landing with minimal damage to their aircraft.

AC3 Harrell's alert response to a potentially dangerous situation saved a valuable aircraft and maybe two priceless, highly trained aviators. Controllers are seldom cited for their outstanding contribution to aviation safety. Their job takes a special breed and talent. — Ed.

When Things Don't Look Right. It was a normal training hop, no different from dozens of others I'd flown since my assignment to the FRS in 1982. The aircraft looked like a good bird after review of the yellow sheets and the crew proceeded to the aircraft to preflight.

My student finished his interior preflight before I had finished the exterior preflight and was seated and on ICS when I entered the aircraft. Since this was only the student's third flight in the plane, I carefully rechecked my students preflight, especially some of the more common areas where problems historically are found. I was almost finished when I noticed a few drops of hydraulic fluid on an aircraft rib. Fluid from static hydraulic leaks is not uncommon in the E-2C; however, these drops were near an area I knew to contain multiple hydraulic lines and the hydraulic emergency generator. In order to more clearly

AIR BREAKS

see the emergency generator and surrounding area, I removed the automatic flight control system computer and discovered hydraulic fluid on the bottom drain line of the emergency generator. Since the generator may only be energized after engine start, I called an AMH troubleshooter and asked that he monitor the generator after start. Upon engine start, I asked the pilots to turn on the emergency generator. When they did so, hydraulic fluid began to spray from the top of the casing of the emergency generator, emptying the full contents of the combined hydraulic system inside the aircraft within a few seconds. The pilots immediately secured the engines and the aircrew exited the aircraft.

The emergency generator supplies electrical power to safety-of-flight equipment in the event of a dual generator failure and is normally only checked upon return from flight as both engines are secured. On this occasion, should the emergency generator have been needed airborne, the results would have been catastrohphic.

I now believe more than ever that experience, that sixth sense we aviators share or whatever one wants to call it, is often critical to our survival. If something doesn't look or feel right, question it . . . it probably isn't.

Submitted by Lt. Mike Jacovelli, VAW-110

Follow That NATOPS! The F-14 launched on a post-maintenance check flight (PMCF). Thirty minutes after launch, as the aircraft was accelerating through 150 knots while recovering from an approach configuration stall, the master caution/bleed duct light illuminated. The pilot immediately selected air source off in accordance with NATOPS. The bleed air light extinguished and the crew aborted the flight and returned to base.

Post-flight inspection revealed that a welded seam in the bleed air duct had failed.

Quick reaction by the aircrew prevented extensive heat damage and eliminated any possible fire source. NATOPS works! Follow it!

Complacency? Maybe. "I was launched from the ship without rendering the mandatory salute to the enlisted safety observer prior to the cat shot. When I recovered, the air boss informed me that his people said they thought they saw a gesture that looked like a salute, so they launched me. The cat officer said that although the setting sun was right in his eyes, he thought he saw something also.

"I still swear I did not salute. Had I become so complacent in the cockpit that I do not even remember saluting? Perhaps the enlisted safety observer was just as guilty of complacency as I was.

"On the day in question perhaps he had gotten himself into such a routine, that after having my aircraft go to high power and receiving a thumbs up all the way around, he knew that it was time to launch the aircraft. So he pointed down the deck and away I went.

"No matter how it happened, the fact that I was shot off before I was ready woke me up out of the doldrums and made me take a harder look at what was happening around me. With the deployment past the two-thirds mark, the ship and air wing were working well together.

"However, with only a short time left, things had begun to change. The briefs in the ready room had become short blurbs which sounded more like 'kick the tires, light the fires. Reviewing the aircraft discrepancy book had become a matter of 'No need, chief. I've flown that bird at least 50 times this cruise and I know what's wrong with it.

"Preflights had deteriorated to nothing more than walk-arounds for effect and exchange of thumbs up with the plane captain. The mission is launched, and after recovery no discrepancies are written because the aircraft was up and the pilot was good enough to handle any problem.

"From the cockpit, the once well-choreographed movements of the flight deck crew now seem more like the time trials for the Indy 500 with not only the high-performance vehicles, but also the hordes of spectators to cheer them on. True, the preceeding examples are taken to the extreme, but they are indicative of how complacent we all can become, especially after several months of good weather, a steady deck and the same thing day after day.

"The only sure way to combat complacency is to make ourselves aware that it is a problem which can affect us all, from line crew to the air wing commander. To beat it, we have to go back to basics. From day one, we are taught attention to detail is everything. We can keep our attention to detail attitude only by making every flight a unique and distinct event, by not letting ourselves become muddled with thoughts of beer day, tigers and the end of the cruise.

"Complacency can kill. It caused me to get launched without a salute (or did I salute?)." ◄

Submitted by Lt. William F. Kauffman, VAW-114.

Sierra Hotel to Delta Sierra in One Easy Lesson

What Price Glory?

By Lt. Mike Manazir

. . . Now comes the decision. We know we're going to be below "emergency tank fuel" (2.5) in just minutes and the deck is not clear. I goofed, but we've got to fess up . . .

As the Tomcat passed the bow of the CV, climbing to 600 feet, the pilot anxiously checked his gauges, noticing a left low fuel light! The right side was indicating only slightly more than the left. Continuing upwind, the pilot spotted two A-7s on downwind. The Tomcat would have to go three miles upwind for interval.

"103, Tower, what's your state?

"2.5 Boss."

"Roger, priority downwind."

Whew! Thanks, Boss. OK, baby, one more time . . . this one has got to be a rails pass . . . not much fuel to play . . . with landing checks complete . . . A-7 in the groove . . . OK, turn now . . .

"103, Paddles, fly a slightly high, coming down approach."

"103, Roger" . . .

There's the ball just a little high, got to work it down. . .

"Don't Climb!" . . .

Ball's coming down . . . power back on . . . Trap! Taxi one wire, but we're aboard. Wow, look at that; both low fuel lights illuminated! That was too close.

The outcome could have been a lot worse than a taxi one wire. How many young, or not so young, aviators have lost an airplane due to fuel starvation? How many more said it would never happen to them? Before this incident, I was one who scoffed at the idea of running my airplane out of fuel due to my own negligence. I have a different opinion now. Let's look at the events that changed my mind. The weather was typical for winter time I.O. 2,000 scattered, visibility 10 miles, seas calm, light northeasterly winds. Eight hundred miles from the nearest divert, the carrier was working blue water operations.

Returning from another uneventful CAP mission, we requested a low pass by the ship. Low pass approved. Great! Beautiful day, crews manning up for the next launch, lots of people on the flight deck. Great opportunity to look S. H. around the ship and show everyone what fighter aviation is all about.

Reporting three miles astern, I rechecked my fuel state. The totalizer indicated 6.5 (6,500 pounds JP-5). Max trap for our configuration was 4.5. Next launch was in 15 minutes with three airplanes, recovery to follow. That left approximately 25 minutes until a ready deck. Heck, it's a nice day. That's plenty of gas (or was it?).

The RIO and I estimated the fly-by would take 1,200 pounds of fuel; however, we failed to recall that our assumption of 2,000 pounds per minute fuel flow in zone 5 A/B was based on data collected at 20,000 feet. Our actual fuel consumption was much higher at sea level, aggravated by four Phoenix rails, external fuel tanks and a full weapons loadout.

Selecting Zone 3 A/B, we commenced the fly-by. Nearing the ship at .93 IMN, I selected Zone 5 A/B and streaked down the port side, transonic.

"Looking good, 103, nice vapes!"

"Thanks, Boss, returning to low holding."

Great fly-by! I'll bet they got a charge out of that one! Held it in burner a little long, though. What's the fuel now? Hmmmm, 4.0 and it's still 12 minutes until launch; at least 20 minutes until recovery. At max conserve, that leaves us with 2.6 at the ramp. Two point six equals 400 pounds until low fuel lights, 100 pounds above day emergency tank fuel and 2,500 pounds below squadron SOP fuel on deck! Rats! We may have gooned this one. Well, we'll make it. Zip-lip recovery — no one will be any the wiser.

Holding overhead, we "hawked" the deck. At launch time, one Tomcat launched. The second airplane taxied over the JBD, went into tension and promptly suspended. The pucker factor got a little more acute. Check the fuel state: 3.0. "Charlie fuel" for the Tomcat is 3.40 daytime. Now comes the decision. We know we're going to be below "emergency tank fuel" (2.5) in just minutes and the deck is not clear. I goofed, but we've got to fess up.

"Boss, 103, we're Charlie fuel"

"You're what?!"

Sure didn't sound like the friendly voice who moments ago told us how great we looked. I'll bet the phones are ringing right now between the tower, bridge and the ready room. Finally, the deck was clear. We broke, rolled into the groove with 2.7 and promptly got a technique wave-off. Turning downwind, we made one more pass and trapped, landing with 2.1. We went from a comfortable fuel state to below what's allowed all by ourselves. Although we were safely on deck, we learned a few more important lessons about carrier aviation.

Don't be lulled by calm, clear days around the boat. What is the norm day after day can change in a heartbeat. The deck can go foul when you least expect it. Calculate fuel requirements exactly, keeping in mind the parameters used to provide fuel consumption figures. Plan for unforeseen circumstances. Above all, when you put yourself in an extremis situation and it's your fault, don't hesitate to admit it. Better to absorb some flak and a couple of no-fly days than lose an aircraft, or worse, an aircrew.

Aggressiveness needs to be tempered with responsibility and accountability. As one sage aviator so aptly put it, "Ten thousands attaboys are wiped out by a single Delta Sierra."

Lt. Manazir is an F-14 pilot with the Screaming Eagles of VF-51. A 1981 U.S. Naval Academy graduate, he earned his wings in 1983 and has logged more than 500 F-14 hours. His first WESTPAC deployment was on USS *Carl Vinson* (CVN 70).

Forgetting Something?

By Lt. Jerry Buck

COMPLETING post-start checks with the pilot of NL400, the plane captain signals the final checkers to perform the last inspection prior to taxi. With all pre-taxi checks indicating "go," one last cycle of the controls draws a thumbs up from both final checkers, and the plane captain signals to pull chocks. The pilot taxies to the marshal area to wait for the rest of his flight.

As he waits, a careful scan over the cockpit instruments reveals a slightly low hydraulic pressure on one of the systems. A call on the base radio sends a troubleshooter running out to the aircraft to adjust the system pressure. The problem is fixed, and as the rest of the flight is ready, the flight taxies to the runway for takeoff.

Situations similar to this happen occasionally. Hopefully this aircrew will escape the chances of a panel falling off the aircraft, the loss of a tool, or even possibly the loss of the aircraft. But then again, maybe they won't.

What did they forget? How about the final checkers. In this case, only one inspection by the final checkers wasn't sufficient. The final checkers' inspection isn't just one more "X" in the block. It *must* be the very LAST item in the launch sequence before leaving the line area. If the final checkers are allowed to do their job as the very last step before releasing the aircraft for flight, they will catch mistakes and/or hazards such as partially fastened panels and doors, pinned landing gear, lowered stepladders/footsteps, loose racks and possibly lost tools, etc. Although, the aircrew did have final checkers inspect, the aircraft was subsequently worked on and must again be final checked.

A normal man-up, start, taxi and takeoff usually present no problems. But when we get rushed or habit patterns are broken, we are much more susceptible to safety hazards. That's when you have aircraft problems, a hot seat/crew switch, hot refueling or even topping off with fuel that habit patterns are broken and mistakes are more likely to occur.

Taking a look at your own squadron, when was the last time you had an incident (or a potential one), either reportable or not? Every squadron has had them. Was the incident swept under the rug, or was the incident discussed at an AOM as a safety item? Could the final checkers have prevented it? Sometimes they could have. Let's remember, the final checkers are just that . . . *FINAL* checkers. Nobody should touch the aircraft after they have completed their checks. This responsibility lies not only with the pilot but to all maintenance personnel as well.

A second point is to be made here. Because they are only human, the possibility always exists that a final checker may overlook a discrepancy during the inspection. So why not allow an extra set of eyes to inspect the aircraft?

Of all the military and civilian airfields I am familiar with, only one airfield does just that. At NAS Miramar, squadron final checkers inspect the aircraft before they leave the line area. When the aircraft arrive at the hold-short area, they are again inspected, this time by NAS final checkers.

Unnecessary, you say? Hardly. A quick glance at the back page of any Weekly Summary reveals an average of 25 to 30 "parts falling off aircraft this week." That's DISGUSTING! Looking specifically at these lost items, probably as many as a third to a half of these could have been prevented by having an extra person examine the aircraft. This additional inspection could have discovered those partially fastened doors, loose panels, etc.

The point is clear. The final checkers *must* be the LAST persons to come in contact with the aircraft. If subsequent maintenance is performed, the aircraft must be reinspected. Second, NAS Miramar's policy of having a *final* final checker is an excellent one. The commitment of two-to-three persons per day at the hold-short area is a small price to pay, especially when compared to the genuine benefits of minimizing/eliminating the danger and embarrassment of parts falling off aircraft or even the loss of an entire aircraft.

Editor's Note: This final checker program can be very effective — but to a point, according to Cdr. Thomas J. Glover of the Naval Safety Center's Aircraft Maintenance and Material Division. Is the squadron the final check? The NAS? Why not a wing checker after the NAS? At some point we have to stop and go back to basics, notes Glover, who emphasizes that the job should be done right the first time. NAS Miramar's way to go the extra mile may be working effectively, and some Approach readers may wish to consider if such a plan would benefit their operation.

Lt. Buck is with Attack Squadron 27 based at NAS Lemoore, Calif.

The Making of a Real Hacker

By Lcdr. P.H. Mills

IT started at 0700 one morning at NAS "Socal" where I had been stashed after receiving my wings. Having been a hard charging young JO working with "fleet seasoned" aviators for over a year, I had learned the "rewards" of "work-hard-play-hard." I felt professional pride every time I demonstrated to them that "I could hack it." I was convinced that I was the most mature, professional lieutenant junior grade aviator on the west coast.

My assignment that particular morning was to fly the squadron US-2B to Desert AFB to pick up a passenger. This was a 3.5-hour round trip that I had made many times so I filed the standard flight plan, launched on time and returned within five minutes of my ETA at about 1030.

After completing my post-flight paper work, I quickly hit my desk to catch up on the day's business. As squadron material officer, one of my main tasks was scaring up parts to get our aircraft flying again — we called 'em "NORS" items back then — that the supply system refused to cough up. Now and then I could even earn myself some extra flight time by flying to a nearby base to pick one up. Such was the case that day when I had a chance for a second flight in a TA-4. But OPS had an even better plan.

We also needed to pick up Lcdr. Hi Roller at MCAS Outback and deliver him to NAS South Beach. OPS suggested we kill two birds with one stone and file a stop over flight plan to pick up the parts. Then Lcdr. Roller would ride in the back seat of the TA-4 to South Beach where he would attend an important meeting. Then I would return my jet home that night with all missions accomplished. My answer was the one that had proven the key to success so often before in my young career. I can hack it! Not only will I complete their mission *and* mine but I'll get about six hours of jet time on top of my 3.5 hours of "stoof" time, and the *good* deal is that they pay me to do this!

I could make this a long story but this logistics mission went like clockwork through my passenger delivery at South Beach. However, during my turnaround at the transient line, I was reminded by my home base SDO that the field closed early tonight, 2200 vice 2300.

"No sweat! I knew that!" I thought as my professional pride was bursting through my flight suit. I can hack that! I still have 55 minutes to make that last 20-minute leg, "But times awastin here on the ground."

A quick preflight, start and launch at the transient line had me taxing in 20 minutes and I was on my way. As I taxied in the dark through the throat from the "outboard" to the "high speed" taxiway, I suddenly noticed the taxiway getting rough. I realized too late that I was *no longer on the taxiway,* but in the grass median between those two strips of pavement. As I began to apply the brakes my nose dropped about four feet into the muddy ditch that lay ahead in the darkness. My only recourse now was to inform ground control of my dilemma and secure the engine.

The rest of the story simply consists of a ground crew pulling my sleek jet out, and flying home the next day.

Looking back I got pretty lucky. I was an accident waiting to happen but several things have taken many years to sink in:

- I was overextended.
- I was overconfident.
- I failed to realize the true meaning of "professionalism."

By the time I taxied into the mud that night I had been "at work" over 14 hours. In addition, I had spent about 8.5 of those hours in a cockpit. To make matters worse, the longer I succeeded in cheating fate, the better I thought I was and the more I let my guard down. To say the least, I was overconfident.

By the next sunrise "professionalism" had taken on a new meaning to me. It means accomplishing your mission the first time without compromising safety. It is, among other things, knowing when to say "*I can't hack it!*"

My conclusion is obviously that this mishap was due to pilot fatigue as a result of bad judgment. That *is* the main point of this article. There is one other lesson I learned and have tried to preach throughout my subsequent tours as RAG IP and senior squadron pilot. That is, "timely use of the taxi light." I thought about it that night but didn't want to embarrass myself by blinding others on the field. Since then I have used my taxi light sparingly, but *every time* I needed it. It's just another example of professional judgment.

Lcdr. Mills is with VA-27, an A-7 attack squadron based at NAS Lemoore, Calif.

A Night in Paradise

By Lcdr. Fred Spence

IT was not a typical day in paradise. Usually every day was filled with sunshine; the kind of weather everyone enjoys. The warm tropical trades made the islands a haven for the "Malihinis" in winter. But winter brought the occasional Konas. The major storm systems which passed far to the north with their frigid snowstorms for the mainland brought welcome rain to the pineapple and sugarcane farmers here on the Islands. On this day the sky was dismal grey. Wind and rain had whipped across the highway as I drove to the base. Arriving slightly before preflight time, I checked in with the office, put out three brush fires and slayed two medium-sized dragons before the brief.

The two pilots being briefed were both in the aircraft commander syllabus. It was to be a night hop for each, no engine-out work to contend with. Concentration would be on flying the aircraft from both the left and right seats in the VFR bounce patterns. Several precision and non-precision approaches were also to be conducted. Discussion items were things such as lights-out approaches, simulating landings in fog and several emergency situations.

Upon arrival at maintenance control, the hard book revealed that the previous flight had experienced problems with the co-pilot attitude direction indicator (ADI). "Hey chief, what's the status of this gripe?" The maintenance chief consulted the MAF, buzzed the shop and came back with, "It's on order and the ADIs have been swapped so that the good one is on the pilot's side." Further questioning revealed that the bad ADI was still giving some good attitude information but was bad enough to warrant ordering a new one. The supply folks said that they would not receive the new part before our flight had to go. Checking with QA and the mission essential sub-system matrix (MESM), I unhappily trudged off with our two

The runway looked like a river. Water was surging across and the wind blew sheets of it in quick breaking patterns. Tower wanted to know what the braking action was. "Pretty nil," was the answer..

sterling aviators to base ops in the wind and rain.

The weather personnel showed us that the islands were under the influence of one of those storms passing to the north and that some of the fringes were affecting our fair community. As a consolation, the forecaster told us about the record low temperatures and snow it would bring the mainlanders. The off-island field that I had intended to work was reporting the worst weather, so we prudently changed plans and filed to one of the fields at the big island that had the best chance of being VMC.

Preflight, engines starts and takeoff were uneventful. There was a broken layer topping out at 7,500. At our cruising altitude of 9,000 feet I noticed that the co-pilot's ADI was now totally hosed up and that the pilot's ADI was now oscillating up and down ± two degrees about three times a second. Very disconcerting. Maybe they had damaged the instrument in the swap. However, we were VMC and everything looked good in front of us.

The hop proceeded as briefed. We had real nice weather at the outlying field. There was almost no other traffic to contend with. Approach control and the tower were most cooperative and before long the required elements of the syllabus were accomplished and it was time to return home.

I found myself in the left seat at this time and stated that I intended to shoot the TACAN approach back to home field for the full stop. Everything was going nicely until center handed us off to approach and we were instructed to descend to 2,000 feet. At 2,000 we were in the goo, heavy rain and light chop. Did the pilot's ADI appear to be getting a little worse? Approach came up and told us to expect a straight-in because the field was reporting heavy rain and approximately one mile visibility. "Great! A little actual time, actual approach, show these young whippersnappers how it's done," I thought. However, it had been awhile since I had done an actual approach. How long? I couldn't remember. I wasn't able to get out on the road much any more. The XO and skipper kept me pretty busy pushing papers and the only time I got to fly now was about once a week on an instructional hop. My grip on the yoke tightened a little. Watching the steady oscillations of the attitude gyro made me think, "Was the pilot's ADI getting ready to fail?" We completed the approach brief, dirtied up, completed the landing checklist and intercepted the final approach course. Still raining like a mother. At the final approach fix, there was still no sign of the field; just the steady drone of the engines, and beating of the rain penetrating the darkness which enveloped us. Beginning to descend the minimums, I began to have those doubts. You know the ones I mean. They are usually locked safely away in the back of your mind. Some of them are: "You're not so hot!" "Nice night for an accident!" ". . . and the aircraft commander had over 3,700 hours and was the safety/NATOPS officer to boot!" ". . . but he was a real jerk." Nice thoughts to have on final with the weather the way it was. The ADI kept its oscillation and a quick glance at the co-pilot's ADI showed 30 degrees nose up and 45 degrees left wing down. No help there! Well, just keep the scan going. Slightly before missed approach point we broke out. That is to say we could barely see the lights even with the windshield wipers going madly back and forth. When we reported the field in sight to the tower, they told us to remain in visual contact and circle to land on the opposing runway. We responded with displeasure to this untimely news and coerced the tower to clear us for the straight-in as they had previously. I was pretty sure that I would lose sight of the field if we circled. Knowing that we would be landing with a quartering tail wind of about 20 knots, we pressed on. I noticed that we were high on short final, took a final look at airspeed and adjusted the throttles to flight idle. All those little gremlins in the back of my mind were now beating the doors down shrieking and laughing at me.

Touchdown was OK, but we were still going pretty fast and hydroplaning like a big dog. Keeping the wings leveled and using rudder to keep it on the runway, I gingerly brought the throttles back over the ramp and eased into ground idle and checked the brakes. We started slowing down. I eased a little reverse and passed the yoke over to the co-pilot. Brakes were responding more now. We slowed down to a fast taxi, then to a stop. The runway looked like a river. Water was surging across and the wind blew sheets of it in quick breaking patterns. Tower wanted to know what the braking action was. "Pretty nil," was the answer.

Easing off at the last taxiway and calling for the after landing checklist, I bolted up those doors in the back of my mind to the defeated howls of those gruesome nightmares wanting me to go splat in the night. My grip, no longer on the yoke relaxed, on the nose wheel steering and throttles. I was conscious of the wetness of the sweat that had formed in the palms of my flight gloves. Matter of fact, I could feel the perspiration all over my flight suit. "Nice going," a couple of voices said on the ICS. Little did they know about the lump in my throat or that the muscles in my neck felt like the steel springs of my Coupe De Ville. As we taxied to the pits, I had time to think. How long had it been since I had done an approach like that? Certainly I had done a lot of them, many worse than that one. But it had been a while and I had gotten spoiled by all the good weather. I had gotten complacent once again. What would have happened if the pilot's ADI failed? Why did I allow myself to get in that position anyway? How long had it been since I'd had an approach like that? When you live in paradise you have a tendency to forget . . . . ◄

Lcdr. Spence is the Safety/NATOPS Officer for VQ-3.

Close Call Goes Unreported

The base crash telephone rang. The tower controller informed Safety Operations, et al, that the transient C-12, which had just departed after its RON, had shut down one of its engines just after takeoff due to streaming oil on the nacelle. The aircraft turned downwind and executed a smooth single-engine landing on the left parallel runway. Post-flight inspection revealed that the engine oil dipstick/cap had come off, allowing the oil to escape.

While we as observers initially surmised that the C-12 crew had failed to properly check the oil cap on preflight, we were surprised to hear both the pilots and aircrew state that they had checked the cap by both visual and hands-on inspection. Apparently the cap came loose and vibrated off. Now THERE was something to think about! All normal precautions had been taken, yet this crew was required to secure 50 percent of its propulsion system two minutes into a 1,200-plus mile overwater journey. WHAT IF it had happened 500 miles out?

The crew cleaned up the engine compartment, took on some new oil and flew uneventfully back home. We fully expected to see a hazard report from these folks, and when none appeared, we called them. They had hashed it out and decided that there was *nothing to be learned*! Even after some urging on our part, they would not report the occurrence.

I grew up in a mishap-free squadron atmosphere where we encouraged and admired aircrew who shared their airborne experience, no matter how seemingly insignificant or embarrassing. I have personally avoided *numerous* potentially catastrophic situations by remembering sea stories which I had heard earlier.

Now our crews think more about the possibility of shutting down an engine in our reliable C-12, and we hope others do the same. We feel there was a lesson to be learned, and we are disappointed that our C-12 brethren did not share their experience with the community.

Sharingmouse

Landing Checklist Complete?

On arrival at NAS Cubi Point from an uneventful repo in a P-3 from Agana, Guam, the approach controller's vectors

Let Anymouse Know. We encourage you to write Anymouse whenever you see "a mishap about to happen." If you know of a hair-raising situation in the air or on the deck, let Anymouse know about it. You may help someone else avoid an unsafe incident.

Anymouse is a unique department in Approach where no names are used. All information is anonymous. In fact, Anymouse was born three decades ago when someone couldn't spell "anonymous" and signed his letter "anymouse." Thus, a mouse wearing flight gear has become a world-wide naval aviation safety symbol.

Over the years we have found it is often more prudent and speedy to report unsafe situations anonymously. Keep in mind, though, that Anymouse is not interested in personality conflicts or non-constructive criticism of individuals. All views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

For your convenience, postpaid Anymouse mailing forms are available in most ready rooms and from most flight safety officers. Use of the form is not mandatory, though. Just jot down your thoughts and mail to Anymouse, Approach Magazine, Naval Safety Center, NAS Norfolk, VA 23511-5796.

ANYMOUSE

took us closer than expected to a newly established prohibited area (distraction 1). A short time later, while still heading 270 (downwind for a PAR-RWY7), we were cleared to descend to 2,000 feet and turn to 050 to intercept final.

The PAC called for gear down at the same time that the controller repeated lost comm procedures and switched us to our final controller (distractions 2, 3, 4 and 5). At about 2 ½ miles from touchdown, the controller cleared us to land. From habit when in the right seat, I started to review the landing checklist.

At this time I realized it had never been done to begin with. What a surprise! After almost 6 ½ years in P-3s, I thought my habits were well set, but the one of grabbing the checklist as I lower the gear was forgotten today. Fortunately, this time my habit of reviewing the checklist after landing clearance was received served as a reminder, and the checklist was done for the first time two miles on final. A habit pattern repeated made up for a habit pattern broken in this instance. I hope it will next time as well.

Habitmouse

Don't Do As I Do

A senior chief petty officer in this command, on noticing difficulty before an aircraft launch, went from the hangar to the line, climbed the aircraft boarding ladder, discussed the situation with the pilot, assisted in a VDI change and remained on the line until the aircraft taxied to the runway. Not really anything remarkable there — except this squadron has a policy that cranials and hearing protection are required on all launches and recoveries. The chief had neither!

Even better (or worse), the pilot was the squadron safety officer, and the squadron maintenance officer watched the evolution from the hangar. The MO's only words to the senior chief were, "Congratulations on making master chief." As an E-4, were I to do what the chief did, I'm sure that both the safety officer and the MO would have had much more to say to me! Folks, I'm supposed to follow your example. Is this really the way you want me to do it?

Cranialconsciousmouse

Is a Seep a Leak?

There's a doubt in my mind about a minor fuel leak in the L/H torque box of an H-46 stubwing. I've always been taught and told that *any* fuel leak is a downing discrepancy. Everything you're taught or told isn't necessarily true, however, and there are certain exceptions to every rule.

I read NATOPS power plants and general information instruction manuals, but I can't find any specifics on my question. Continuing to do my job, I consult a professional, a top all-systems QAR. He says, "It's fine, no problem."

We play a minor word game of leaking or seeping, but what's the difference? There's also the question of excessive or not, but who's to determine? I'm still in doubt, but I have to accept the word of the professional, right or wrong — safe or not, because my job is to fly it.

This is just one example, but I believe today there are too many shortcuts and poor maintenance habits practiced in naval aviation. With our advanced technology and machinery, we need more personnel who can see past their noses, especially when it concerns the safety and well-being of others.

Stillindoubtmouse

Safety Center analysts recommend use of NA01-1A-35 Section V and Section IX, which will assist you in answering problems of this nature. The bottom line is that fuel leaks have no place in naval aviation. If it's leaking fuel, something is wrong!

How Low Is "a Little Low"?

A student solo and flight were cleared for takeoff (two formation solos, one chase) at NAS Training. Upon positioning on the runway, another aircraft at the hold short line called and stated "Lead's nose tire looks a little low." (It's pretty easy **to see and compare** when three aircraft are on the runway.)

The chase aircraft proceeded to taxi a little forward to look at his solo's nose tire, after which the following transmission was heard: "It looks a little low but should be OK."

How can a tire that "looks a little low" be OK? What ever happened to getting it checked out by a troubleshooter? Don't people know that an underinflated tire is very susceptible to blowout (the side walls get broken down internally)?

Has the "almighty X" become so important we are willing to take a plane with a low tire, or worse, send a solo out with one, especially the nose?! Last I heard, the beaches have not been invaded, nor the airspace penetrated. Let's re-evaluate some of our safety principles. No mission in peacetime is that important.

Underinflatedmouse

A Plug to Remember

By Lt. Kevin L. Schellerup

OUR ship was only a couple of days out of NAS Disneyland in the Southwest Pacific heading for Gonzo station in the Indian Ocean. It was my first real cruise, but I was ready for it after a year of work-ups and minicruises. The brief went smoothly; we were slated for an afternoon practice raid followed by some bombing on the spar, then returning to the marshal stack for a night recovery.

Weather was forecast for scattered, variable broken layers with isolated buildups in the ship's vicinity; no big deal. Inspecting the weight sheet, I realized that with no drop-tank I would have to scrounge some fuel if I was going to complete the raid since I was not on the tanking plan. An unsuccessful call to air ops yielded no gas. I'd try for the tanker airborne.

Preflight and launch were uneventful, the only thing out of the ordinary being the plane's fuel totalizer reading 10,500 pounds instead of 10,200 pounds which is the plane's capacity. No problem, the fuel discrepancy was well within A-7 NATOPS limits, but I just hadn't seen that problem in a while. One of the weather buildups was over the ship for launch so I went in search of the off-going tanker, that was maneuvering to stay VFR. Isolated buildups? After locating the tanker and obtaining the necessary fuel, an attempt to rendezvous with the raiders was fruitless since they had already headed out. Notifying the raid leader of the situation, I dialed in the small-boy's TACAN for a vector direct to the spar to get rid of my MK-76s. En route my TACAN began locking off 40 degrees and arbitrarily adding distance to the DME. No problem.

Having a sweet radar got me to the spar successfully and subsequent bombing was uneventful. Return to mother also went smoothly, anchoring overhead for a random vector recovery because of my TACAN problems. While awaiting the start of the recovery, I was quite impressed by the size of the "isolated" buildups and amount of lightning they were producing. My front radio was on departure/tanker control as assigned, and my back radio was on marshal control to monitor the stack and keep receiving the latest information. SPN-41/42 needles were on and checked good, which is always a reassuring feeling. While awaiting the recovery, my TACAN azimuth shifted 180 degrees out; but I thought it was just my TACAN acting up again until some other aircraft chimed in and asked about the TACAN status, and received a reply that it was down. Great! Marshal was now having to stack people above the ship in preparation for vector recoveries.

Finally my instructions came; the usual, "302 descend to 1.2, take downwind heading, when straight and level dirty up." Fuel was 4.1 at six miles on final when the ship called

"ship's in a starboard turn for winds." Judging how quickly the ICLS needle went screaming to the side of the HSI, I put in a major correction attempting to salvage the pass but when I broke out at about 400 feet the ship was still turning and I responded to the infamous wave-off lights and the inevitable proverbial call, "Three-zero-two, wave it off! Out of limits."

After an extention downwind to 12 miles, I was on final for another pass, fuel reading 3.4. Two aircraft ahead got the call, "Ship's in a thunderstorm, winds 37 knots, gusting." My second pass soon became history when at the 200-feet minimums I didn't see the lens and the LSO didn't see me. Third time down the chute, PAR was down, needles were called "unreliable" and at 600 feet I was waved off because Paddles had a visual illusion of my plane being in a 30-degree angle-of-bank. This startled me when I heard the call, "Three-zero-two, level your wings and climb! Climb! Climb!" My ADI was showing level wings confirmed by my standby reference.

After that heart thumper, I was down to 2.9 on the fuel. My next turn-in finally came at 11 miles after some prompting and, as luck would have it, I broke out about 300 feet a little low and slow, immediately adding power and flying through the glideslope to a bolter and a fuel reading of 2.3 (2.1 being the air wing's bluewater tank state at night). "Three-zero-two, your signal is tank; hook up, clean up, climb straight ahead, passing 2.5 contact tanker control, button seven."

Three calls to tanker control finally resulted in a vector. Another call yielded the tanker's altitude. After what seemed like an eternity, another prompting got me a revised vector. I had a fuel reading of 1.8 at that point. Still popeye, I was listening to two other aircraft in the same relative situation, one of which was in the process of plugging. Breaking out of the thunder cell I was in, the tanker's position lights shone brightly at last. But it was about five miles away and not coming in my direction. By the end of the rendezvous I was down to 1.2 on the gauge. An EA-6 ahead of me was attempting to plug a hose that was all over the sky because of the turbulence, and my mind was thinking of the 300-pound discrepancy I had noticed earlier. The EA-6 was scheduled to get 4.0, so by the time they finished I was down to 1.0 and only scheduled to get a thousand pounds! A quick counseling session with tanker control convinced them to give me 2.0; meanwhile, the tanker was being vectored back toward the ship. Maneuvering into position behind the drogue, we hit a cloud and popeye, so I returned to parade position awaiting some reasonable visibility. Finding a stretch of clear, I again attempted positioning for the plug but we again went into a cloud. So back up into parade to wait. I made yet another try for position but the hose was all over the sky and then another cloud hit and this time I couldn't even see the tanker's wing lights. Fortunately, this was a short stretch because it's no fun flying off basket lights, especially when they are all over the sky.

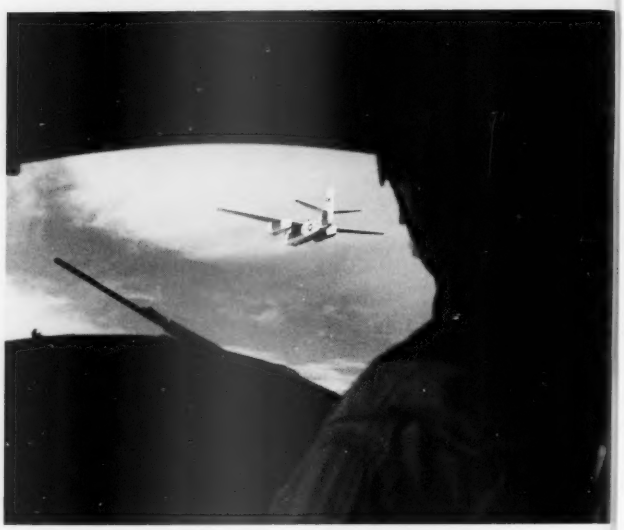
Finally, the hose steadied long enough and "Ka-chunk!," the sweet sound of the probe locking into the basket. With 800 pounds on the gauge, an absolutely euphoric feeling passed over me. Tanking complete, the 47 miles back to the ship were uneventful, leading to a trap and an enormous adrenalin let down that lasted for hours.

Here are some lessons I learned, or reaffirmed, on that night:

- Given the choice of whether to chase the basket or revert to basics and just fly formation on the tanker, I believe flying basic form finally allowed me to plug. The basket eventually settled down long enough to plug, and chasing it could have easily led to a smashed canopy or a broken probe.
- A tanker pilot has got to take charge of the tanking evolution. VFR with aircraft waiting to plug is not a time to accept a vector into marginal weather. The tanker should maintain VFR and wait until tanking is complete. At least 300 pounds of fuel was wasted flying through clouds.
- Consider for a moment, the geometry of planes coming down final, all of them following needles, and a plane or two on a vectored downwind heading. When the ship executes a right turn, the whole string on final shifts left with the downwind birds flying right through the new "final" path, at co-altitude, popeye! This resulted in at least two near midairs that I know about.
- Finally, the guys back in air ops *must* maintain the big picture. It may have been better to give the EA-6 2.0, then me 2.0, then back to the EA-6 for the remainder of their gas. This method might result in a little more risk, but at least two aircraft are still flying and able to wait for another tanker, rather than one A-7 almost going for a swim. ◄

Lt. Scheiterlein is an A-7E pilot with VA-97 deployed aboard the USS *Carl Vinson*. He is a graduate of Michigan State University.

Engine-out F



FLYING multiengine propeller aircraft can be challenging when confronted with an engine failure. With all engines operating, there are few characteristic differences between multiengine and single-engine aircraft. With a loss of engine power, however, asymmetric thrust will drastically change the flight characteristics of our usually well-behaved multiengine aircraft.

Let me point out what theoretically happens and what actions should be taken to maintain control of a multiengine aircraft experiencing an engine failure. All principles discussed can be applied to U.S. multiengine aircraft. (This includes P-3s, C-130s, C-12s, C-1s and T-44s. Actually, all multiengine aircraft with clockwise rotating propellers.)

We need to review some basic aerodynamic principles in order to understand asymmetric flight characteristics. Let's break it down to propeller and airframe aerodynamic effects.

Propellers — The following aerodynamic effects are present on both single- as well as multiengine aircraft.

1. Slipstream effect — a rotating propeller (producing thrust) imparts a rotating motion to the airstream. As the airstream moves aft, a force is exerted on the left side of the vertical stabilizer and rudder. Slipstream effect is much less prevalent on multiengine aircraft as compared to single-engine aircraft. But, it is present and must be considered.

2. P-factor (asymmetric disk loading) — Due to the characteristics of flight, the airstream does not strike the propeller's rotational plane at a 90-degree angle (especially at low airspeeds/high angle of attack). Due to the angle of the apparent wind, a downward-rotating propeller blade

utFlying Technique

By Lt. Richard B. Bobbitt

produces more lift than an ascending blade. With clockwise rotating propellers, the overall thrust vector will be to the right of center of the propeller's rotational plane:

Airframe — The following aerodynamic principles must be considered in conjunction with propeller aerodynamic effects.

1. There are four forces that are always present in balanced, unaccelerated flight. They are lift, drag, thrust and weight.

2. Lift, drag, thrust and weight vectors work *through* the center of gravity (CG). Yaw, roll and pitch forces work *around* the center of gravity:

3. When lift is increased on an airfoil, drag correspondingly increases.

All the above aerodynamic effects come into play when power loss is experienced. Operating parameters of a specific aircraft are based on the above theories. Two other important multiengine concepts are:

The *critical engine* is the engine that, if failed, would adversely affect heading control. On clockwise rotating engine aircraft, the left engine is the critical engine. This is primarily due to P-factor as well as slipstream effect.

V_{mc} airspeed is the minimum control airspeed while airborne. V_{mc} is the calibrated airspeed at which, when the critical engine fails, it is possible to recover heading control of the aircraft with that engine still inoperative and maintain straight flight with a five-degree angle of bank into the operating engine. V_{mc} is usually marked as a red line on the airspeed indicator.

Loss of thrust from an engine obviously will cause a yawing force. The amount of yaw can be represented as follows:

Yaw = (T) x (X)

Where T = thrust vector

X = Arm from CG to thrust vector.

The yawing force can be overcome in *two* ways. First, use of rudder alone while maintaining wings level:

(T) x (X) = (R) x (Y)

Where R = Rudder lift vector

Y = Arm from CG to rudder lift vector.

Although the yawing force will be countered, several negative effects will be the result:

The aircraft will not track parallel to its longitudinal axis. The flight path will be askew from the operating engine. By adding the thrust vector (T) and the rudder lift vector (R), a resulting vector shows a track away from the operating engine.

As pointed out above, an increase in lift directly increases drag. As rudder lift is increased, the overall drag is increased (at a time when extra drag is not needed).

A second method (and most preferable) to counter yaw, is to displace the weight vector into the yawing force by banking five degrees into the operating engine.

Several advantages are gained by using the wing low method vice wings level. First, the amount of rudder lift required to counter the yawing force is substantially reduced. Second, the relative wind striking the vertical stabilizer and rudder increases the apparent angle of attack which increases the effectiveness of the vertical assembly.

Third, and probably the most important, the flight path resulting from the wing low method is parallel to the aircraft's longitudinal axis. (The displaced weight vector will counter any rudder lift vector required.)

Where R = Rudder lift

W = Displaced weight

T = Thrust

There is one negative effect to the wing low method. As in any forward slip, reduced wing span perpendicular to the

weight vector requires an increase in wing lift to stay airborne. Thus, drag is increased requiring an increase in power.

Loss of an engine degrades an aircraft's performance substantially, even with the wing low method applied. On a light twin such as a T-44, not 50 percent but *80 percent of aircraft performance is lost* when operating single-engine. Flight tests have shown that multiengine aircraft perform substantially better with wing down into the operating engine, vice wings level. The loss of lift resulting from the wing low method is less of a factor than the increased drag associated with the wing level method. Banking into the operating engine *reduces* V_{mc}, whereas increasing angle of bank away from the optimum angle of bank (five degrees wing down) *increases* V_{mc} at the rate of approximately 3 knots per degree of bank angle. Also, the straight aircraft track associated with the wing low method is much more desirable than the askew flight path associated with the wings level method.

No doubt, banking into the operating engine is the best method to control yaw. Question: Where should the balance ball be? With the wing banked five degrees into the operating engine, the balance ball will be deflected up to one diameter into the operating engine. If the ball is centered with the wing down, the aircraft will turn.

A simple in-flight demonstration can be used to show the difference between wings level and wing low methods. Prior to flight, tape a piece of yarn close to the center of the aircraft's windscreen. Then follow these steps at a safe altitude (usually 5,000 feet).

1. With all engines operating, maintain straight and level, balanced flight. Note the position of the "yaw" string. (A grease pencil is handy.)

2. Simulate shutting down the critical engine.

3. Position the aircraft 500 feet below a reference altitude (i.e., 5,500 feet; 6,000 as ref.) and slow to engine out climb speed. (Preferably V_{yse}.)

4. Maintain wings level, ball centered and add climb power on the operating engine(s).

5. Note yaw string indication. It will be deflected into the operating engine(s). This shows a path through the air away from the operating engine(s).

6. Continue climbing wings level. Note the time it takes to climb from the reference altitude to 500 feet above.

7. Reposition the aircraft again 500 feet below the reference altitude and slow to engine-out climb speed.

8. Add climb power on the operating engine(s). This time, bank five degrees into the operating engine(s) and apply rudder as required to keep the yaw string centered.

9. Note that the balance ball is not centered, but deflected toward the operating engine(s).

10. Note the time it takes for the aircraft to climb from the reference altitude to 500 feet above. Keep five degrees banked into the operating engine(s), yaw string centered.

11. According to the type of aircraft, the time required to climb wings level will be much greater than wing low method.

To sum it all up, loss of engine thrust on a multiengine aircraft requires three to five degrees bank into the operating engine(s). The balance ball will be deflected toward the operating engine(s). The amount of bank angle and balance ball deflection required depends on the amount of asymmetric thrust present. FAA manuals go as far as to state that engine-out flight with the wings level, ball centered is never correct. In any case, handling an engine-out situation takes positive control techniques and finesse. And lots of practice.

Lt. Bobbitt is the NATOPS officer for VT-28, a T-44 training squadron in Corpus Christi, Texas.

Hot Tracks

By Lt. C.J. Boblit

. . . I turned to my left and saw JP-5 overflowing from the bucket that was hanging under the drop-tank . . .

THIS is a short sea story concerning flight deck safety awareness. Being a "new guy" in an A-7 squadron, my first REFTRA proved to be a learning experience in many ways, not the least of which took place one afternoon on the flight deck.

A "veteran" of two cyclic ops sorties, I walked confidently to the bow of the ship to man up. The aircraft was spotted directly on top of cat II. It was a cool and windy afternoon off SOCAL, and I was enjoying the relative quiet of the flight deck prior to flight ops commencing. I began preflighting the aircraft, and in so doing, knelt to check the starboard wheelwell. Ducking under the gear door, I put my hand on the deck to support myself . . . DAMN! The cat track was hot! Startled and a bit more cautious, I completed a normal preflight. The aircraft was configured with a drop-tank on the port wing, with a bucket hanging under the vent drain to catch any inadvertently vented or leaked fuel. After checking the tank and bucket, I climbed into the cockpit.

The start and post-start checks were completed uneventfully. The drop-tank, filled with about 2,000 pounds of fuel, was checked for proper pressurization with no abnormalities. I was busy with cockpit switchology when I saw my plane captain turn from the starboard to the port side of the aircraft, then run aft down the flight deck waving his arms excitedly. I turned to my left and saw JP-5 overflowing from the bucket that was hanging under the drop-tank.

Deck personnel (including firefighters) began to arrive on the scene amid much shouting and scrambling about. My thoughts at this point were primarily concerned with whether the aircraft would be "down," and prevent me from flying. I sat in the cockpit *observing* the prompt and professional way in which the deck personnel were handling this emergency . . . wait a second! Emergency? I had been watching fuel pour onto that hot cat track!

Up to this point, I was still securely strapped in my "Stencil" ejection seat; leg straps, lap belts and shoulder harnesses all snug and tight. I had not personally initiated any action in response to this situation.

As it turned out, no immediate action on my part was necessary. The spilled fuel was efficiently taken care of, there was no fire and the leak was stopped. I pondered my delayed response and lack of awareness as I hurriedly unstrapped. What if that fuel had ignited on the hot cat track and flames had immediately shot up?! I'm not sure what the realistic possibility of that happening was, but it sure would have been smart to be unstrapped and ready to egress!

The problem here was not one of procedural knowledge, but of safety *awareness*. There are a lot of specific emergencies and situations on the flight deck to know about and be prepared for, but one has to be ready for anything. The key is to be alert and be able to respond to any potentially dangerous situation. The flight deck demands our respect and diligent safety awareness is essential. With my "head on a swivel," I'll enter my next at-sea period as a saltier and more *aware* aviator. ◄

Lt. Boblit flies A-7s with VA-27, NAS Lemoore, Calif.

Distinguished Flying Cross

Cdr. David G. Strong
VFP-206

Commander Strong, the squadron executive officer, was the wingman in a flight of two RF-8G Crusaders scheduled for a training mission while the reserve squadron was deployed to NAS Miramar. As the flight took off, the engine in his aircraft exploded as he deselected afterburner. (Post-mishap investigation revealed the failure of the combustion chamber outer front case which resulted in a loss of power and thrust.)

With an indicated airspeed of 325 knots and 1,000 feet altitude, Strong quickly decided to try to get the damaged aircraft out over the water to avoid a populated area beneath him. However, the Crusader was on fire and was rapidly becoming uncontrollable. Acutely aware of the peril facing him, the pilot stayed with his plane until the moment when it would no longer respond to control inputs and was, in fact, in an uncommanded right roll. At this time, Strong ejected. The Crusader impacted a parking lot, causing no loss of life or serious injuries. After landing and discarding his parachute, Strong aided the local fire department in fighting the fire.

Strong is quick to point out that no one should be encouraged to delay the ejection decision beyond the capability of the escape system available. Commander, Carrier Reserve Air Wing 20 commented:

"The pilot's exceptional, professional performance, demonstrated courage and outstanding airmanship were responsible for preventing a major disaster. . . This instance of success, surviving uninjured from, literally, a last-second ejection, should not encourage others to take such a risk. . . This pilot knew precisely what he was doing . . . what he was risking to save those on the ground . . . he had the skill and judgment to accomplish it."

The commanding officer of VFP-206 added, "Strong exhibited extraordinary concern for the civilian populace. . ."

Strong was awarded the Distinguished Flying Cross as a result of his actions during this incident.

BRAVO ZULU

Petty Officer Donald mans the tower at Beirut International (left) and at his current assignment at NAEC Lakehurst, NJ (below).

AC1 Robert L. Donald

On the morning of 25 October 1983, elements of the 22nd Marine Amphibious Unit landed on the island of Grenada as part of Operation Urgent Fury. Their immediate objective was to secure Pearls airfield, the only operational airport on the island. Soon after the Marines had taken the airfield, Petty Officer Donald took charge of the battle-damaged control tower and re-opened the field to air traffic. Despite the fact that the tower was exposed to enemy fire and was in close proximity to large tanks of jet fuel, Donald volunteered to stay in the tower through an enemy mortar attack.

That night, Donald functioned as a member of a Marine rifle squad, defending the field.

Soon afterwards, Donald was re-deployed to Lebanon, where he manned the control tower at Beirut International Airport during combat conditions.

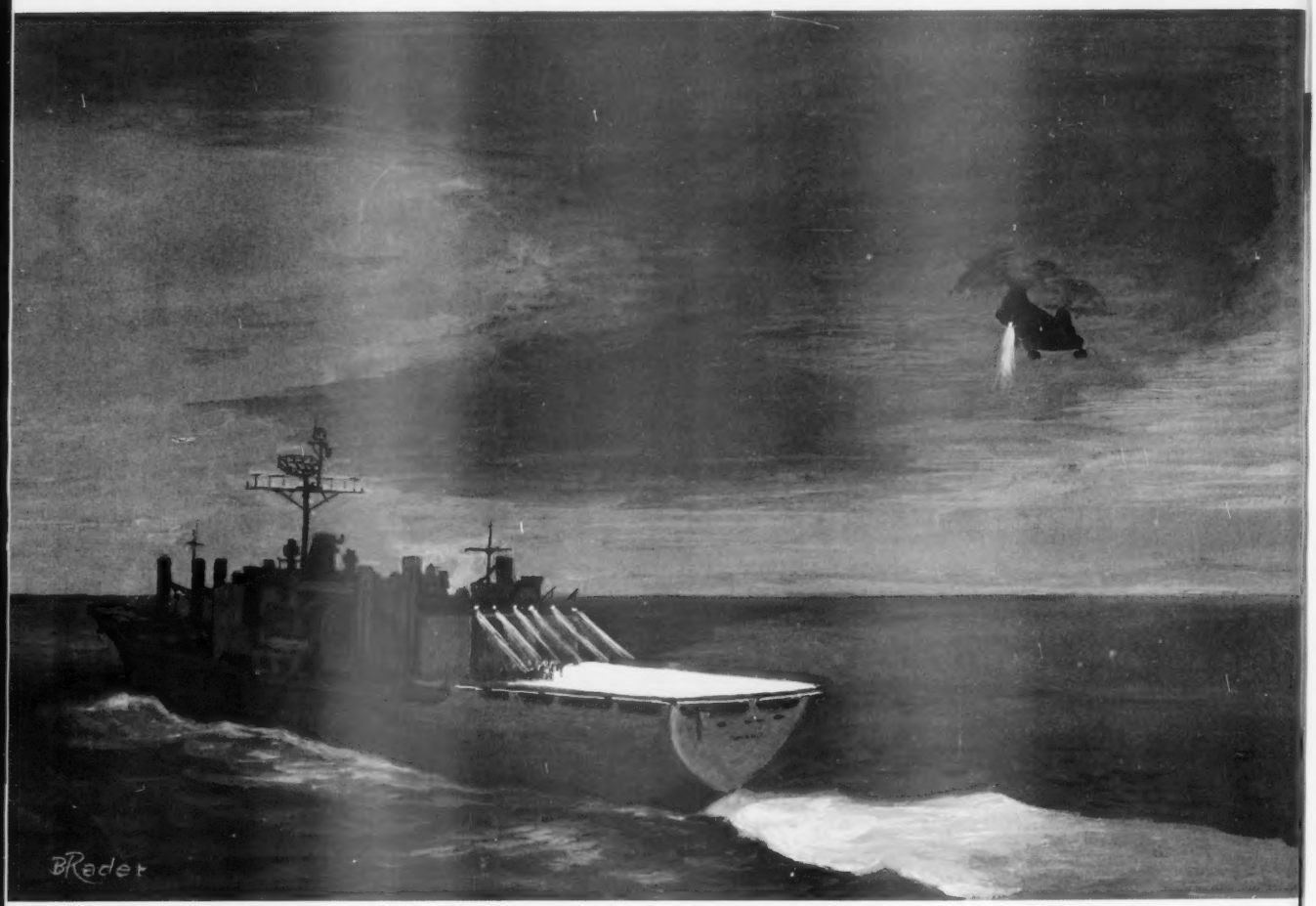
Petty Officer Donald received the Navy Achievement Medal for service in Grenada, the Navy Commendation Medal for service in Tactical Air Control Squadron 22 from July 1983 to June 1984 and the Vice Admiral Robert B. Pirie Naval Air Traffic Controller of the Year Award for 1984.

Navy Achievement Medal

Navy Commendation Medal

The habits you practice and make a part of your flying routine will automatically be there when they are needed in an inadvertant IFR situation.

Co-Pilot Commentary



THE gauges and caution lights all looked in order as we stabilized into a hover over our AFS deck. The pilot at the controls had a good hover established and transitioned to an instrument scan as we launched from the lighted deck into the enveloping black-

y on a Severe VFR Night

By Lt. Peter J. Sciabarra

ness to the port side of our ship.

I called out the standard instrument takeoff (ITO) items monitoring our altitude and airspeed parameters just as on any other night launch from the ship: "Positive rate of climb, airspeed on the rise, passing through 50 feet, you've got 30 knots; 100 feet, 50 knots; 150 feet, 70 knots, ALT HOLD coming on; good airspeed, good altitude, cleared to come left." It was just another night "touch and go" training hop on a very clear, cloudless night. I continued to call our pattern by keeping visual contact with the ship, while the pilot at the controls remained on an instrument scan, which is the standard procedure in a dual-piloted helicopter at night.

At this point, the tower controller asked us to stand off on the starboard side of the ship while the flight deck crew checked on a lineup light that was not functioning. I continued to call my pilot's turns until suddenly at 300 feet I lost sight of my ship, the stars, the horizon, everything. We were in some solid clouds which had only appeared to be a very thin layer as we made our turn. Still not too concerned with the situation, since we had just completed approximately 30 minutes in the "touch and go" pattern in severe night VFR conditions, we turned back to where we knew it would be clear.

After several minutes of waiting to "break out," we both came to the conclusion that we were in rapidly deteriorating weather. Our call to the ship confirmed this. The tower officer reported that in a span of just a few minutes the weather had deteriorated such that the flight deck visibility was near zero.

Our first reaction was to warn our playmate, who was working approaches to an amphib deck about eight miles away. Now my play-by-play on the gauges became more critical as we juggled between UHF and VHF transmissions with our tower and our playmate. We elected to try a climb to VFR conditions and broke out on top of a solid layer at 600 feet, after our previous attempts to get below the clouds were aborted at 100 feet, with still no visual references in sight. The presence of several other ships steaming with us in various positions kept us wanting to stay above the clouds, rather than risking a midair with an oiler.

Up on top we followed our TACAN needle and flew what we estimated to be right up the ship's wake at 600 feet. We noted the position of our ship by the white glow we flew over at our minimum DME reading. Our playmate's arrival on the scene also kept us busy staying clear of him and avoiding the IFR conditions which kept intensifying all around us. It wasn't until this time, approximately 25 minutes after our entry into the goo, that I realized that I had been doing a running commentary of our airspeed, attitude and altitude at about one-minute intervals.

We managed to finally identify an area that appeared to be clearing and our ship maneuvered to head for that area. We then vectored our playmate to that area, and he was able to land safely at home plate. Ten minutes later, we found a hole in the clouds and dropped down to VFR conditions at approximately 100 feet off the water. After some excellent concentration and flying by the aircraft commander, we had a fairly uneventful recovery.

The lesson of this scenario to me was to finally point out the reason why we call out all those altitudes and airspeeds, even on a VFR night in the pattern. The habits you practice and make a part of your flying routine will automatically be there when they are needed in an actual inadvertant IFR situation if you diligently adhere to doing it that way all the time. It took me almost a year and a half from getting my wings to see demonstrated why we fly a dual-piloted helicopter as methodically as we do. I had always perceived the practice of monitoring our gauge status on a VFR night as a means of keeping the co-pilot busy while he was not actually flying.

The calls I was making were being done automatically, almost without thinking, due to an acquired habit pattern. Occasionally, one tends to forget why we use an endless stream of checklists and a rigid set of operating procedures. This incident points out clearly why we acquire habits and fly as methodically as we do, even on a night when it appeared that weather would not be a factor. You never can tell when the procedures you are just practicing are going to be just the ones which keep you alive. ◄

Lt. Sciabarra is a CH-46 pilot with HC-6, Det. 12.

. . . Target fascination, although not strictly illusion, is a form of disorientation since the pilot's attention is diverted to task performance unrelated to flying — occasionally to his detriment . . .

Spatial D
in Naval A

Spatial Disorientation in Naval Aviation

By Lcdr. Donald C. Arthur, MC

AIRCRAFT mishap reports are full of unexplained tragedies — the aircraft that takes off on a moonless night and silently plunges into the ocean less than a mile from the end of the runway . . . the F-4 that departs formation flight, exhibits erratic maneuvers and plunges into the ocean under full power . . . a fatally late pullout from a practice bombing run . . . the sudden loss of controlled flight at the ninety. One of the leading factors cited in incidents like these is **spatial disorientation**.

The ordinarily fine balance among the organs which allow us to maintain equilibrium and balance can be disrupted by the unusual attitudes and accelerative forces encountered in naval aviation. Although the medical community uses the term **vertigo** only to describe the sensation of spinning (either the person or the environment appearing to spin), aviators describe nearly **any** type of disorientation as vertigo — including directional confusion. Since the term vertigo can be misleading, we should try to restrict references to vertigo to those circumstances which result in a false spinning sensation.

Pilots are most susceptible to disorientation when busy, anxious, unusually stressed or fatigued, hypoxic or under temperature or emotional stress. Medications and G stresses can also impair the pilot's ability to resist disorienting sensations. Critical times are when transiting from VMC (visual meteorological conditions) to IMC (instrument meteorologic conditions), night flight, in unusual or rapidly changing weather conditions, entering or recovering from unusual attitudes and during formation flying. Pilots with less instrument time are also more susceptible to disorientation.

Spatial orientation is provided by input from the inner ear (called the vestibular system and includes the semicircular canals), vision and other body position sensors called proprioceptors. The inner ear has two components which are stimulated by either rotory or linear acceleration. Approximately 20 to 30 seconds after a constant velocity is established, as in a constant rate of turn, these organs become accustomed to the new orientation and register it as the new norm — reset to receive new input. In addition, there is a threshold for stimulation of these organs and accelerations, below which a threshold value will not be registered. Proprioception is a term used to describe an appreciation of position based on the relative forces sensed by body surfaces and joint movements. This input can be deceiving in aviation since force vectors are modified by acceleration and gravity vectors.

The following is a summary of the most common types of spatial disorientations encountered in military aircraft:

The leans is the most common flight illusion and is caused by reversal of a flight attitude to which the pilot has become accustomed. That is, if one were to maintain a constant 30-degree angle-of-bank turn for a couple of minutes, the vestibular system would become accustomed to the turn and view it as the new norm. Once the turn is discontinued in favor of level flight, the vestibular system now perceives a 30-degree angle-of-bank turn in the *opposite* direction (a 30-degree deviation from the new norm). If the pilot has no visual or instrument cues to guide him, he may follow the natural tendency to reassume what the vestibular system thinks is a normal attitude: the original 30-degree angle-of-bank turn. Even with visual or instrument references, the pilot will feel as if he should lean in the direction of the original turn. A variation on this theme occurs when a pilot initiates a turn which is imperceptible to the vestibular system because the roll rate is insufficient to cause vestibular stimulation (less than threshold). If the pilot then corrects with a more rapid roll in the opposite direction, since the original turn was too slow to register, the perception will be that there was only one turn — the rapid one — and the pilot will tend to lean in the direction of the original (slow) roll which is perceived as level flight.

The graveyard spin is another variation of the leans in which the pilot enters a spin which lasts longer than 20 to 30 seconds. Initially, the fluid in the semicircular canals accelerates, giving the correct input of spin direction and speed. After a few seconds, the fluid movement reaches a new equilibrium and the spinning sensation is replaced by a feeling of no movement even though the spin continues. If the spin is then corrected and level flight is resumed, a reversal of the semicircular canal fluid movement will (falsely) tell the pilot that he has entered an equal but opposite spin. The natural reaction is for the pilot to attempt to correct by putting the aircraft back into the original spin.

The graveyard spiral is very similar to the graveyard spin except that the pilot unknowingly assumes a descending turn rather than a stalled spin and his vestibular system becomes accustomed to the turn. When the pilot notices a loss of altitude and either pulls back on the stick or adds power without first correcting the nose-down attitude, the spiral will tighten and the rate of descent will increase. Once the spiral is established, the vestibular system will become accustomed to the spiral as the new norm, and when the pilot returns to level flight, he will suffer the illusion of turning in the opposite direction and may compensate by re-entering the spiral.

The coriolos effect is another illusion caused by the vestibular system becoming accustomed to turning. During a prolonged

. . . The flickering of the anti-collision lights or direct sunlight through helicopter blades, or slowly rotating propeller blades during taxiing, can cause disorientation and, in rare cases, seizures . . .

coordinated turn, the fluid in the semicircular canals which are initially stimulated attains a constant speed and the sensation of motion ceases. If the pilot then moves his head so that he places the semicircular canals in a different orientation, he will sense rotation or movement in a different spatial plane. This effect of combined turning sensations can be overwhelming and result in unpredictable maneuvers to correct what is perceived as uncontrolled rolling, turning or spinning. Since the coriolis effect can be overwhelming and most often occurs close to the ground (when looking at one's kneeboard in break or turn to final, for example), it is one of the most dangerous illusions.

The oculogravic illusion usually occurs during level forward acceleration and is the false sensation of a nose-up attitude. The horizontal acceleration vector is shifted by the vertical gravitational vector so that the net seat-of-the-pants feeling is slightly nose-up rather than directly forward. This illusion can be dangerous when taking off in conditions of low visibility (a moonless night without a good horizon, for example) and has accounted for many mishaps within a mile after takeoff as the pilot attempts to correct for the feeling of a nose-up attitude by pushing the nose over. Another variation of this illusion is created during a pushover from a climb to level flight. The resultant vectors create the feeling of backward rotation and the natural tendency is to push the nose further over to stop the perceived backward motion, thereby increasing the vectors and intensifying the illusion.

The elevator illusion is interesting because it results from one of the body's normal compensatory mechanisms. During unexpected upward accelerations (as in an updraft), the vestibular organs tilt the eye with a compensatory downward tracking movement designed to follow objects as the body rises. Because the instrument panel remains fixed in front of the pilot, the tracking reflex causes the illusion of the panel rising. The pilot then feels that a nose-down correction is appropriate.

False vertical and horizontal cues often cause problems when flying over a sloping cloud cover or gently sloping terrain. The pilot may feel compelled to adjust his wing attitude to match the sloping horizon. A similar reaction occurs in northern regions when slanting aurora borealis lights give the pilot a false sense of the vertical plane.

Blending of the earth and sky often occurs on especially dark nights when lights from the stars are indistinguishable from those of the earth or on overcast nights when there are no ground lights (over ocean, for example) to help gain a horizontal orientation.

Relative motion is a common illusion in formation flying and is similar to the feeling of motion produced by an adjacent car creeping forward at a stop light. This illusion is even more pronounced in aviation since there are few stable external reference points.

Autokinesis, the false perception that a small stationary, steady light is moving, is another illusion which can cause problems in formation flying. This effect can be diminished by occasionally redirecting one's gaze or looking at a reference object, increasing the size, brilliance or number of lights, or by changing from a steady to a blinking light.

Flicker vertigo (not true vertigo) has been reported by pilots. Direct sunlight through helicopter blades can cause disorientation and, in rare cases, seizures. Flickering anti-collision lights, although too slow to induce flicker vertigo, can be very irritating or distracting — especially in clouds at night.

Rotor downwash in a low hover over water can give the impression that the helicopter is rising. Inattention to instrument input might lead the pilot to succumb to the natural tendency to compensate by inappropriately descending.

Target fascination, although not strictly an illusion, is a form of disorentation since the pilot's attention is diverted to task performance unrelated to flying — occasionally to his detriment. The low altitude bombing run is the classic example: the pilot concentrates on the target so long that his pull up is initiated too late to clear obstacles.

Prevention of disorientation must be a conscious effort; early transition to instruments when visibility diminishes, not relying on the seat-of-the-pants sensory input, not mixing instrument flying with visual flight rules, avoiding head movements which can cause disorientation (especially during turns), being particularly vigilant during high-risk conditions such as darkness and low visibility, maintaining instrument proficiency and not flying with an upper respiratory infection, when under medication or when emotionally stressed. Overcoming disorientation requires concentration, composure and intellectual command of the aircraft despite the distractions. Persistent minor disorientation (the leans, for example) may be quelled by redirecting one's attention. More compelling disorientation requires greater concentration and dependence on instruments, maintaining proper scan and not mixing visual with instrument references. Head movements should be minimized and, in multiseat aircraft, the co-pilot should assume control if he is unaffected. Lastly, the aircraft should be abandoned if control and orientation cannot be regained.

Remember, all of these effects are normal body responses to confusing sensory input and under the right conditions can be experienced by anyone with any experience level. Your flight surgeon can give you more details about these illusions and their application in your aircraft. ◄

Lcdr. Arthur is the senior medical officer aboard USS *Kittyhawk*.

Way Over the Limit

By Lcdr. C.P. Langford

THE phone call came at 0300 after a holiday. Petty Officer Jones, a sharp young metalsmith, had been killed in a motorcyle mishap. Shaking off the initial shock, I got into uniform and drove to the hangar to join a grim-faced skipper, CDO and SDO as we set about the task of notifying the next of kin. I gathered the available details from the SDO and began the safety investigation. It's probably human nature for me to have a first thought that the dead sailor was an unfortunate victim. I knew Jones to be an experienced motorcycle operator and conscientious about wearing protective equipment; an unlikely prospect for an accident. His roommates indicated nothing unusual in his activities that day. A statement from the base security patrolman at the scene about the passenger in the car appearing drunk led me to suspect that the other guy had been drunk and was at fault. However, the truth became painfully clear as the morning passed. The road surface had been scarred where Jones' motorcycle hit the oncoming car head-on in the oncoming lane. A tip from one of his friends gave me the name of a bar he frequently visited. An emotional confession from his drinking buddy confirmed Jones had been there until 0100 and had been drinking heavily. Finally, the coroner ended all doubts: The blood alcohol level was .26 percent, way over the legal limit.

The sequence of events was very easy to reconstruct. Jones had left the bar and rode toward home at a high rate of speed. Approximately three-quarters of a mile down the road his motorcycle crossed the centerline and hit a compact car head-on, literally stopping the car in its tracks. First his wrists, then his legs were broken as he was flung forward, hitting the handlebars and bending them into a forward pointing "V." He hit the car's windshield head first, bounced heavily on the roof and landed 40 feet from the crash on the side of the road. The front end of the car was smashed in two feet and the engine was pushed back into the passenger compartment. Petty Officer Jones died quickly from a 2-inch tear in his aorta that resulted from the tremendous hydraulic pressure in his chest at impact. A skull fracture and cerebral hemorrhage completed the list of injuries. The other driver survived the impact, but was trapped for minutes in the tangled wreck before being extracted.

With the facts established, parents notified, memorial service scheduled, we were able to take time to consider the things we could have done to avoid this tradgedy. One of the first things that came to light was that we missed a number of hints that Jones was headed for trouble. The officer who inventoried Jones' effects found a number of bar chits from his favorite watering holes. His service record showed a previous DWI and a captain's mast for an incident of drunkenness. A reputation for being a "heavy partier" and a fast, hard motorcycle rider surfaced as his squadron mates reflected on Jones' death. I could only speculate how many other times Jones might have been late to work, slow on the job or involved in some minor scrape that would have revealed a problem.

Our job as supervisors, division officers, department heads, etc, in combatting alcohol abuse is two-fold: prevention and detection. For prevention, ensure your informal programs such as squadron picnics or parties are consistent with formal programs by playing down the use of alcohol as the source of entertainment and by providing alternatives. Make your formal programs more than a check in the box by assigning your quality people as substance abuse counselors and by making your required training meaningful. For instance, invite a coroner or highway patrolman for your driving safety presentation. He will probably bring pictures that will get the attention of the most grizzled veteran. Even with a strong prevention program in place, there is still a need to detect problems and intervene before an individual is involved in a mishap. Be alert for adverse trends such as tardiness, poor work performance and problems with conduct. Work with available experts (squadron flight surgeon/substance abuse counselors) to analyze these trends. By knowing your people, their distress signals, and procedures to get help, you may be able to prevent the painful loss of a squadron mate. ◄

Lcdr. Langford is the aviation safety officer for VAQ-34. .

Navigation Equipment Word Scramble

By Lcdr. Thomas V. Watkins
VQ-4

Using the words at the bottom of the word scramble, circle appropriate letters to spell each word. Words may be spelled forward, backward, diagonally or up and down.

M E N G D S C A M C G J T I W E S C K N
Y S L G E Q O N L W O O I K R P W T F U
U D W G A M N Z P T O M S Z Q Q X K H D
Y U U F I T S K P R I B P C K H P R F S
N V I N M R B F F S M M R A J M E N L B
T O L W K X S O E W U T E M S X Y S B C
O N M O E B P P M X D L W T L S H A M T
H Q A O E H I T U E G Q V A E Q S Q K J
F A J T F Z L S L H G I S K R R F F Z S
X V C U X I S A A N M A Z W O S I J S A
E J S J D E S T I P G A D Q A Z M F Z G
F X I S K O S Q T T Y N R M U H G R Q M
T A G O W B P M Y W R D M E G S R F D T
F B W A W R H P F U F E X F I W F S A N
G Q O Y Q K A D L G I X N Q W D S S A D
Y A N Z G M U D C E F L D I C P B R M A
W J X A E W R K A R R Q R U B A O T C C
O W T K H Y D K P R R U Y G U L D L Q W
Q A T K Z Z T B Q X M M G J N Y Z R W H
Q L A Z Z O C B I U T E D I S M K S H Q

Find these words in the above puzzle:

Ahrs
Loran
Altimeter
Omega
Compass
Radar
Doppler
Sextant
Inertial
TAS

LETTERS

Re: Inside Back Cover (April '85)

Patuxent River, Md. — The idea "ROTOR VIBRATION — don't be a hero . . . put it down," is a sound one. However, depicting an H-46 that appears to be shaking itself apart links a potentially dangerous situation with a totally inappropriate response.

(From H-46A/D NATOPS IC59, dtd Dec 1984) "A potentially violent aircraft oscillatory mode has been identified in the H-46 which is characterized by lateral oscillations at approximately 3.5 cps (slower than 1/rev) and dramatic cockpit accelerations." Oddly enough, this phenomenon feels just as your picture looks! The unfortunate part of all this is that three H-46 helicopters have been destroyed since 1982 because the pilots tried to land the shaking helos and encountered ground resonance. (NATOPS now warns against landing while oscillating.) Because of these mishaps, Naval Air Test Center undertook and completed a flight test program in 1983/84 and recommended specifications to take which have repeatedly resulted in convergence/subsidence of the oscillatory condition (which is linked to high SAS gains). This allows the pilot to land the helo safely.

My intention is not to link all vibrations in the H-46 to this phenomenon — all frog drivers know we have plenty to choose from! — but to remind you all that vibrations take many forms. The correct reaction/response comes from knowing your aircraft and its history.

Lt. Colleen Nevius
Rotary Wing Aircraft Test Directorate
Naval Air Test Center

Re: "Three-Engine Landing" (Nov '8)

Washington, D.C. — Lcdr. Miller's analysis (Letter, April, 1985) of Lt. Duffy's article concerning how not to ride out an "eventful three-engine landing" (as opposed to an uneventful three-engine landing) is no doubt academically correct. However, I questioned his deductions concerning due course of justice, and his caustic attack on the PPC in question (deductions based mostly on hindsight and hearsay, since he has little historical data on which to base any conclusions).

Since Approach depends upon openness and candor from Duffy to fill its pages, Miller's unwarranted (but no doubt correct) blind attack can hardly encourage other aviators to "fess up." People make mistakes. By airing our goofs, the next guy, hopefully won't make the same blunders. Such open communication is integral to safe aviating practices at the squadron level and Navy-wide.

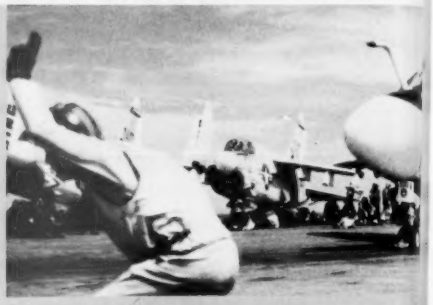
Miller asserted that little or no corrective action was taken by the command. I assure you that the event stirred much interest at *all* levels of command. The happenings were completely evaluated and analyzed. The PPC's designation *was* revoked, and he underwent re-evaluation, including another qualifying check ride. Everyone involved realized how tragic the outcome might have been. But instead of shooting the pilot as an example, cooler heads prevailed and he was returned to productive use.

Miller has an excellent reputation in the P-3 community and has made some informative contributions to Approach. However, he needs to review the basics of Research 101. In this case, insufficient and inadequate data, along with poor assumptions led to some flawed conclusions.

Cdr. Terry A. Richardson
CNO Congressional Coord. Section

Re: A Collection (Jun '85)

NAS Pensacola, Fla. — It is a shame that such a fine piece is marred by the photo on page 22. If you look in the background you will see flight deck maintenance men sitting and laying down during what is supposed to be flight ops.



As a former flight deck coordinator, I know that professionalism and safety are paramount on the flight deck. We must make sure we relay that to all who read or look through our magazines, if we stage a photo as this one must have been. Lets pay attention to all the details.

PRCS (AW) W.M. Horn
Aircraft Intermediate
Maintenance Department

• That picture was not only "supposed" to be flight ops, it *was* flight ops. To the best of our knowledge, that shot was not staged, but taken during an actual launch!

You are absolutely correct about lounging around on deck. I wish I could say I've never seen such a thing, but I have, all too often. Khaki on the flight deck, take note! — Ed.

Re: Mission Change (Apr '85)

Honolulu, Hawaii — Lcdr. Murray wrote an interesting article about suddenly being tasked with his S-3A crew to perform a search for a man overboard. What is most fascinating is how the S-3A crew found the individual at all considering how unaware they were of published SAR procedures. Search procedures are explained in NWP-37B, and a handy SAR TACAID (NWP 55-8 SAR) has been developed to assist crews in the situation Murray found himself.

Under the conditions given in the article, the S-3A crew flew a track spacing 10 times greater than desired and at too high of an altitude. Their on-scene commander checklist was incomplete according to Navy directives, and they got no help from the battle group who should have specified a SAR mission coordinator (SMC) to handle these details.

Finding the individual with a calculated probability of detection of 10 percent or less was, as Murray stated, a lucky day.

Lcdr. K.J. Sullivan
Joint Rescue Coordination Center

Help Wanted: Approach Editor

This is a unique, challenging and very rewarding opportunity for a junior officer. It requires a 13XX lieutenant due for shore duty in the June '86 time frame. Significant writing experience would be very helpful, but is not required. If you are interested, contact your detailer. If you want to know more about the job itself, contact the current editor, Lt. John Flynn. The address and phone numbers are on page 1.

Approach welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: Approach Editor, Naval Safety Center, NAS Norfolk, Va. 23511-5796. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

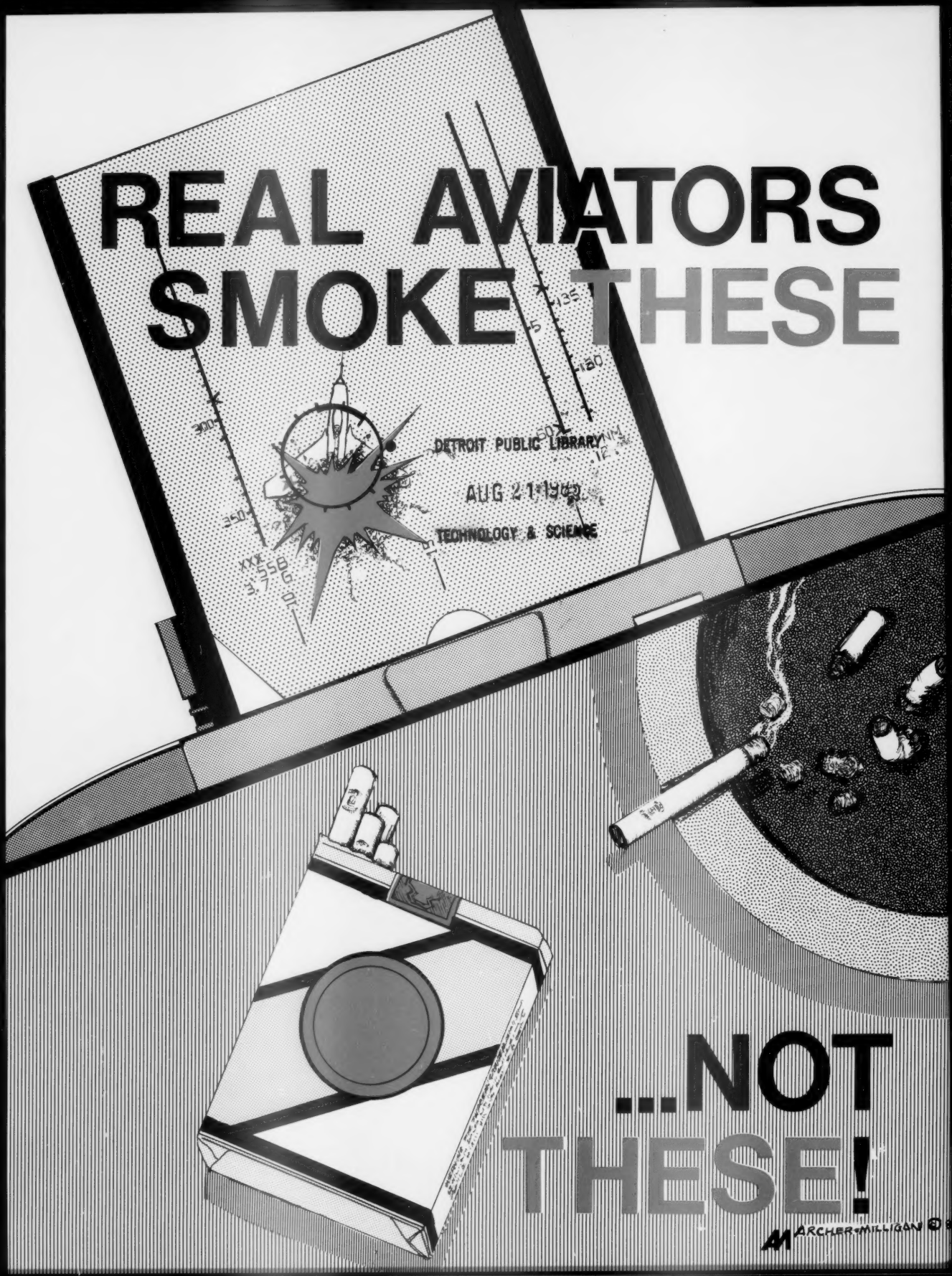
*U.S. GOVERNMENT PRINTING OFFICE: 1985-537-011:20007

LISTEN, PADDLES, DON'T TEMPT FATE...

HONOR THE WAVEOFF WINDOW!

Naval Safety Center
NAS Norfolk, Virginia

Poster idea contributed by the LSO School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